

Citation:

Bertrais S, Galan P, Renault N, Zarebska M, Preziosi P, Hercberg S. Consumption of soup and nutritional intake in French adults: consequences for nutritional status. *J Hum Nutr Diet*. 2001;14(2):121-8.

PubMed ID: [11330261](#)

Study Design:

cross-sectional study

Class:

D - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

The impact of soup consumption on nutrient intake and nutritional indicators was assessed in adults who consumed soup compared to those who did not or who were occasional eaters.

Inclusion Criteria:

participants who had completed twelve 24 hour dietary records over 2 years (60,444 records)

Exclusion Criteria:

Irregular responders (<12 records for 2 years)

Description of Study Protocol:**Recruitment**

- Participants in the SU.VI.MAX cohort: SUpplementation en Vitamines et Mineaux AntioXydants study.

Design

- The SU.VI.MAX study was randomized double-blind, placebo-controlled, primary prevention trial designed to test the efficacy of daily supplementation with antioxidant vitamins and minerals at nutritional doses, in reducing major health problems in industrialized countries, and especially the main causes of premature death.
- The current study is a cross-sectional study within the framework of the overall larger study.

Blinding used

- Double-blinded for the overall study but not for the cross-sectional study.

Intervention

- Respondents were divided into three groups: (1) those who ate soup 0-2 days or less out of 6 days were classified as occasional or non consumers; (2) those who consumed soup 3-4 days out of 6 were defined as regular consumers; (3) those who consumed soup 5-6 days out of 6 were defined as heavy consumers.

Statistical Analysis

- Data were compiled on an Alpha-VMS system using SAS and a specific database developed for handling the data by SAS.
- Descriptive statistics (means, standard deviation) were used to summarize the data.
- Analysis of variance techniques were applied to test for differences between groups of soup eaters.
- Factorial analysis of correspondence was used to test the relationship between groups of soup eaters and markers of nutritional status (BMI and blood cholesterol levels).

Data Collection Summary:

Timing of Measurements

- A 2-year period between the basal evaluation in 1994 and the subsequent 8 years of follow-up.

Dependent Variables

- Energy intake
- BMI
- Total blood cholesterol

Independent Variables

- Soup consumption: occasional or non-consumers; regular consumers; heavy consumers: average intake from 12 24-hour dietary records collected over 2 years.

Control Variables

- Unclear if there were any.
- Seasonal variations were discussed.

Description of Actual Data Sample:

Initial N: 12,735 subjects in overall study

Attrition (final N):

- Men: 2188
- Women: 2849

Age:

- Men: aged 45-60 years
- Women: aged 35-60 years

Ethnicity: not given

Other relevant demographics: adults living in France

Anthropometrics baseline data not given

Location: France

Summary of Results:

Key Findings:

- Mean soup consumption in the total population was 49.8 ± 48.2 (SD) mL per day for men and 46.4 ± 45.7 mL per day for women.
- Mean energy intake was lower in heavy consumers (males: 2406 ± 46 ; females: 1784 ± 37 kcal) than in occasional or non-consumers (males: 2444 ± 17 ; females: 1831 ± 12 kcal) but the difference was statistically significant only in women ($P=0.02$).
- In both sexes, heavy consumers of soup had significantly higher intakes of carbohydrates and lower lipid intakes.
- The consumption of alcohol was lower in heavy consumers.
- Soup consumers presented lower energy intake at dinner than occasional or non-consumers; 92% of soups were consumed for dinner. Soup consumers presented lower energy intake at dinner than occasional/non-consumers ($P \leq 10^{-6}$ for men and women). In men, energy intakes at dinner for heavy and occasional/non-consumers were 756 ± 22 and 909 ± 8 kcal, respectively. In women, energy intakes at dinner for heavy and occasional/non-consumers were 548 ± 3 and 655 ± 6 kcal, respectively.
- In soup consumers, breakfast and lunch contained a higher amount of carbohydrates, lipids and proteins, but dinner contained significantly lower amounts of lipids and proteins.
- A higher frequency of BMI > 27 kg/m² was found in occasional or non-consumers of soup; conversely, a higher frequency of BMI between 23 and 27 was found in regular consumers of soup and a higher frequency of BMI < 23 kg/m² was found in heavy consumers.
- For women, an association was found between occasional or non-consumers and BMI > 25 kg/m², and between heavy consumers and BMI < 22 kg/m².
- An association was found only in men between heavy consumption of soup and a lower value of serum cholesterol.

Other Findings

- 7% of women and 9% of men were heavy consumers.
- 46% of women and 42% of men were regular consumers.
- 47% of women and 49% of men were occasional or non-consumers.
- Consumption was higher in autumn and winter, with a maximum in January.
- Farmers were heavy consumers of soups (29.6% of men; 26.9% of women).
- The lowest frequency of consumption of soup was observed in workers (3% of men; 8% of women).

Author Conclusion:

The present data suggest that the consumption of soups contribute to a balanced diet. Consumption of soup may be beneficial for a healthy nutritional status in the overall population.

Reviewer Comments:

This reviewer felt this article was unclear in the description of some of its methodology and statistical analyses. Points of concern are listed below.

- *It is unclear the exact time frame that the 12 24-h dietary records were collected. A two-year period is listed, but it is not stated when this occurred within the framework of the overall study.*
- *Collection of dietary information appears to have been all computer-based with no interaction with study personnel. Use of a computer program, having to connect to a server to transmit their data and figuring out portion sizes, could have been contributing factors in a lower response rate. However, an actual response rate was not given; it is implied through the differences in n.*
- *No limitations or biases were discussed.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions

1.	Was the research question clearly stated?	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	Was the selection of study subjects/patients free from bias?	Yes

2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	No
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	Were study groups comparable?	???
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	???
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	???
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	???
4.1.	Were follow-up methods described and the same for all groups?	???
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	N/A
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	N/A
4.4.	Were reasons for withdrawals similar across groups?	???
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	Yes

5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	???

7.7.	Were the measurements conducted consistently across groups?	Yes
8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	???
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	???
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	???
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	No
10.	Is bias due to study's funding or sponsorship unlikely?	???
10.1.	Were sources of funding and investigators' affiliations described?	???
10.2.	Was the study free from apparent conflict of interest?	???

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